

NEW SPECIES OF *NOTASPIDIUM* DALLA TORRE
FROM THE NEARCTIC AND NEOTROPICAL REGIONS
(HYMENOPTERA: CHALCIDIDAE)

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Abstract.—Eleven new species of *Notaspidium* are described from the Nearctic and Neotropical regions: *N. acutum* NEW SPECIES, *N. boharti* NEW SPECIES, *N. braziliense* NEW SPECIES, *N. burdicki* NEW SPECIES, *N. giganteum* NEW SPECIES, *N. hansonii* NEW SPECIES, *N. lineatum* NEW SPECIES, *N. mexicanum* NEW SPECIES, *N. minutum* NEW SPECIES, *N. truncatum* NEW SPECIES, and *N. villegasi* NEW SPECIES. *Notaspidium formiciforme* (Walker), the only species previously described from these regions, is redescribed and its female is described for the first time. The taxonomic history of *Notaspidium* is discussed, and characters to distinguish it from other New World Chalcididae are presented. The first host information is presented for *Notaspidium*.

Key Words.—Insecta, *Notaspidium*, Nearctic, Neotropical, Chalcididae, Chalcidoidea, Hymenoptera

Notaspidium are small (1 to 4 mm) metallic green to black chalcidid wasps which have blue, violet, gold, or silver iridescence on the mesosoma, and orange or brown antennae, tegulae, or legs. The metallic green color is unique in the Chalcididae except for some Australian and Oriental species of *Steninvreia* and *Notaspidiella*. Most chalcidid species are black, brown, yellow, red, orange, or a combination of these colors.

Four species of *Notaspidium* have been described: *N. bakeri* Narendran (1989) from Mindanao, the Philippines; *N. formiciforme* (Walker) (1834) from Saint Vincent Island, West Indies; *N. grisselli* Narendran (1987) from Kerala, India; and *N. papuanum* Boucek (1988) from the Aieme River, Papua New Guinea. Walker (1871) illustrated the habitus, mesosoma, gaster, and head of *N. formiciforme*, but Narendran (1987) erroneously illustrated a male of *N. giganteum* as *N. formiciforme*. These are the only publications dealing with *Notaspidium*.

This paper clarifies *N. formiciforme* by redescribing the male and describing the female, describes new species, and diagnoses the *Notaspidium*. Eleven species of *Notaspidium* from the Nearctic and Neotropical regions are described and illustrated. A key is omitted here, because many descriptions of additional new species and a key to all of the American species are forthcoming (unpublished data).

The only existing biological information on *Notaspidium* is that Central American species are found on twigs infested by bark beetles (Scolytidae) (Boucek 1988). New host information indicates that specimens have emerged from an unidentified dead branch, and from an unidentified lepidopterous pupa (attached to specimen) in U. S. quarantine of a Jamaican shipment. Biological control benefits and possibilities of *Notaspidium* are unknown.

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Distributional information on *Notaspidium* was previously restricted to India, Papua New Guinea, the Philippines and the West Indies (Boucek 1988, Narendran 1989), but is currently expanded to include Argentina, Belize, Brazil, Colombia, Costa Rica, Ecuador, Guatemala, Honduras, Mexico, and Peru. The examination of museum collections and additional collecting in Central and South America will undoubtedly further improve our knowledge and produce many more undescribed species.

Useful species characters include the length of tergum I in relation to that of the gaster; the shape of the gaster, especially the terga and the basal sterna; the shape and sculpture of the scrobe cavity, scutellum, mesopleural acetabulum, metapleuron, hind femur, propodeum, and tergum I; the morphology of the pre-orbital carina; and body color.

Notaspidium may be distinguished from other genera of New World Chalcididae by the following characters: a hind tibia that is truncate distally with two apical spurs (Haltichellinae); a marginal vein of the forewing that does not reach the anterior margin of wing, but is separated from it by a short distance; postmarginal and stigmal veins which are absent (Hybothoracini); a tergum I with a lateral carina dorsally, and occasionally with longitudinal carinae and/or a median carina; a scutellum that is broadly rounded, subacuminate, or with a long, projecting, finger-like process; preorbital carina in some species that form an arch just below anterior ocellus, but which is absent in others; color that is predominantly metallic green or at least metallic green on the mesosoma; and wings that are hyaline.

A mylar glare-reducing screen was used when studying specimens. Abbreviations include: T1 for tergum I, etc., and S1 for sternum I. Museum acronyms are: American Museum of Natural History, New York (AMNH); British Museum of Natural History, London (BMNH); Canadian National Collection, Ottawa (CNC); California State University, Fresno (CSUF); United States National Museum of Natural History, Washington, D.C. (USNM); Utah State University, Logan (USU).

NOTASPIDIUM FORMICIFORME (WALKER)

(Figs. 3, 15, 27, 39, 51, 61)

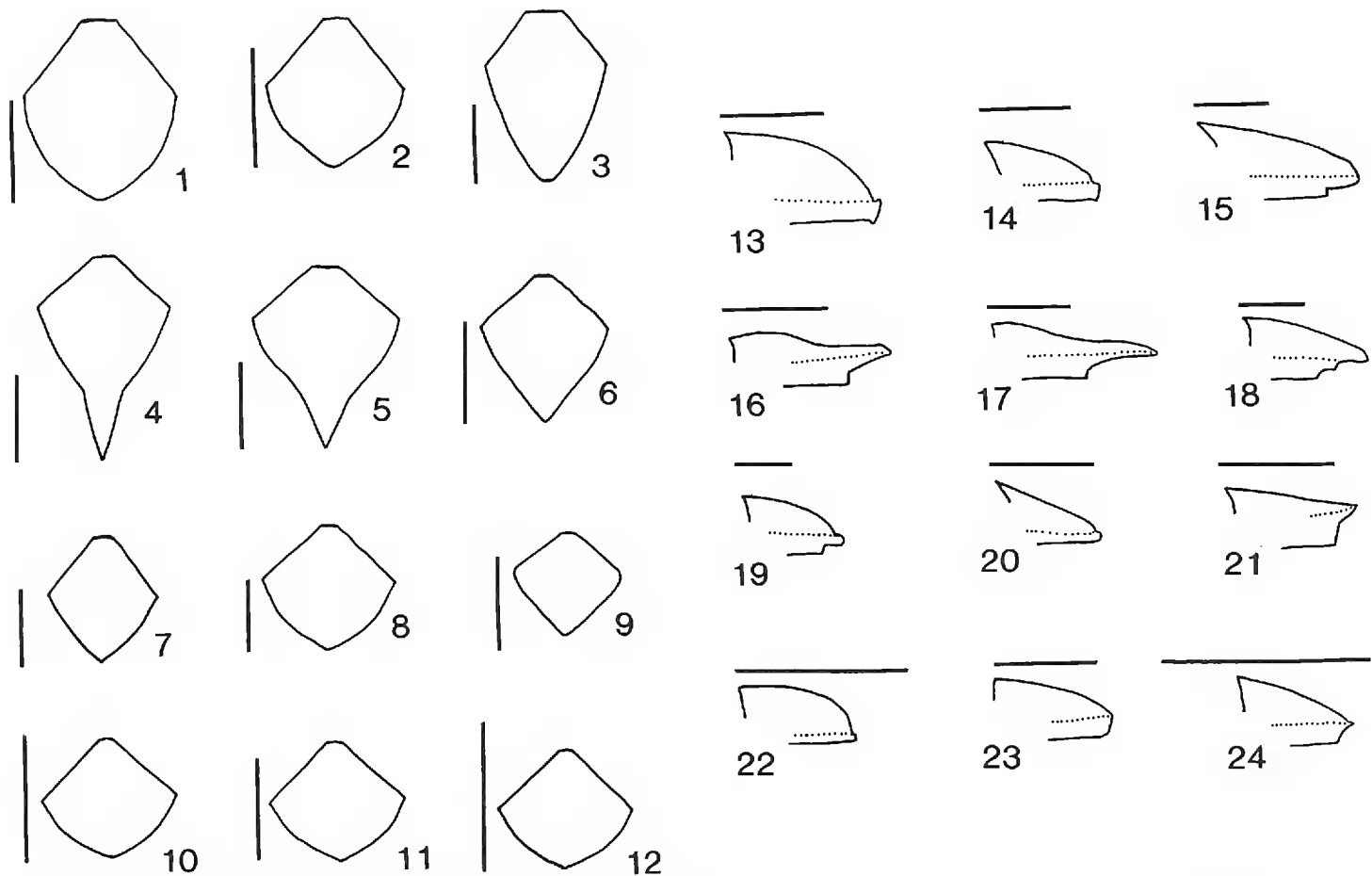
Notaspis formiciformis Walker, 1834: 38. Generic and male description.

Notaspidium formiciformis (Walker), Dalla Torre 1897: 87.

Notaspidium formiciformis (Walker), Narendran 1987: 10. Erroneous illustration of *N. giganteum* n. sp., male.

Types. — Holotype, male; data: WEST INDIES. "St. Vincent I., Lectotype, St. Vincent, *Notaspis formiciformis* Walker, B.M. TYPE HYM. 5.557." Examined by author. Holotype resides in the British Museum (Natural History), London.

Redescription. — *Male* (holotype). *Length:* 2.2 mm. *Color:* dark metallic blue green with mesosoma dorsally metallic purple; tegula and apex of fore tibia testaceous; antenna dark brown. Middle legs and tarsi absent from holotype (but see female description). *Scrobe cavity:* deeply concave, coriaceous. *Preorbital carina:* prominent, broad, forming an arch just below anterior ocellus. *Scutellum:* long, subacuminate posteriorly in dorsal view (as in female, Fig. 3), dorsal margin slightly convex, posterior margin angled in lateral view (Fig. 61); punctures separated by $0.33 \times$ their diameter; sculpture coriaceous. *Metapleuron:* covered by about 15 oval punctures, sculpture in punctures rugose; septa between punctures $0.33\text{--}0.5 \times$ puncture diameter, integument polished. *Hind femora:* as in female (Fig. 51). *Propodeum:* apicolateral margin (dorsal view) with a rounded tooth (Fig. 39). *Gaster:* apex subacuminate, dorsal margin strongly convex (lateral view) (as in female, Fig. 27). *T1:* $0.75 \times$ length



Figures 1–24. *Notaspidium* spp., females. Scutellum in dorsal view (Figures 1–12); lateral view (Figures 13–24). Figures 1, 13. *N. giganteum* NEW SPECIES. Figures 2, 14. *N. villegasi* NEW SPECIES. Figures 3, 15. *N. formiciforme* (Walker). Figures 4, 17. *N. acutum* NEW SPECIES. Figures 5, 16. *N. burdicki* NEW SPECIES. Figures 6, 18. *N. truncatum* NEW SPECIES. Figures 7, 19. *N. brazilense* NEW SPECIES. Figures 8, 20. *N. hansonii* NEW SPECIES. Figures 9, 21. *N. lineatum* NEW SPECIES. Figures 10, 22. *N. boharti* NEW SPECIES. Figures 11, 23. *N. mexicanum* NEW SPECIES. Figures 12, 24. *N. minutum* NEW SPECIES. Scale lines 0.3 mm.

of gaster (dorsal view), dorsally with a strong, broad lateral and median carina (as in female, Fig. 39); sculpture rugose basally between lateral carina, longitudinally striated to apex of lateral carina, followed by a coriaceous band then minutely punctate along posterior margin, punctate laterally. *T2*: dorsally and sublaterally punctate, remainder polished. *T3–5*: basal one-half polished, apical one-half punctate. *T6*: punctate. *S1*: basally with a small tooth (as in female, Fig. 27).

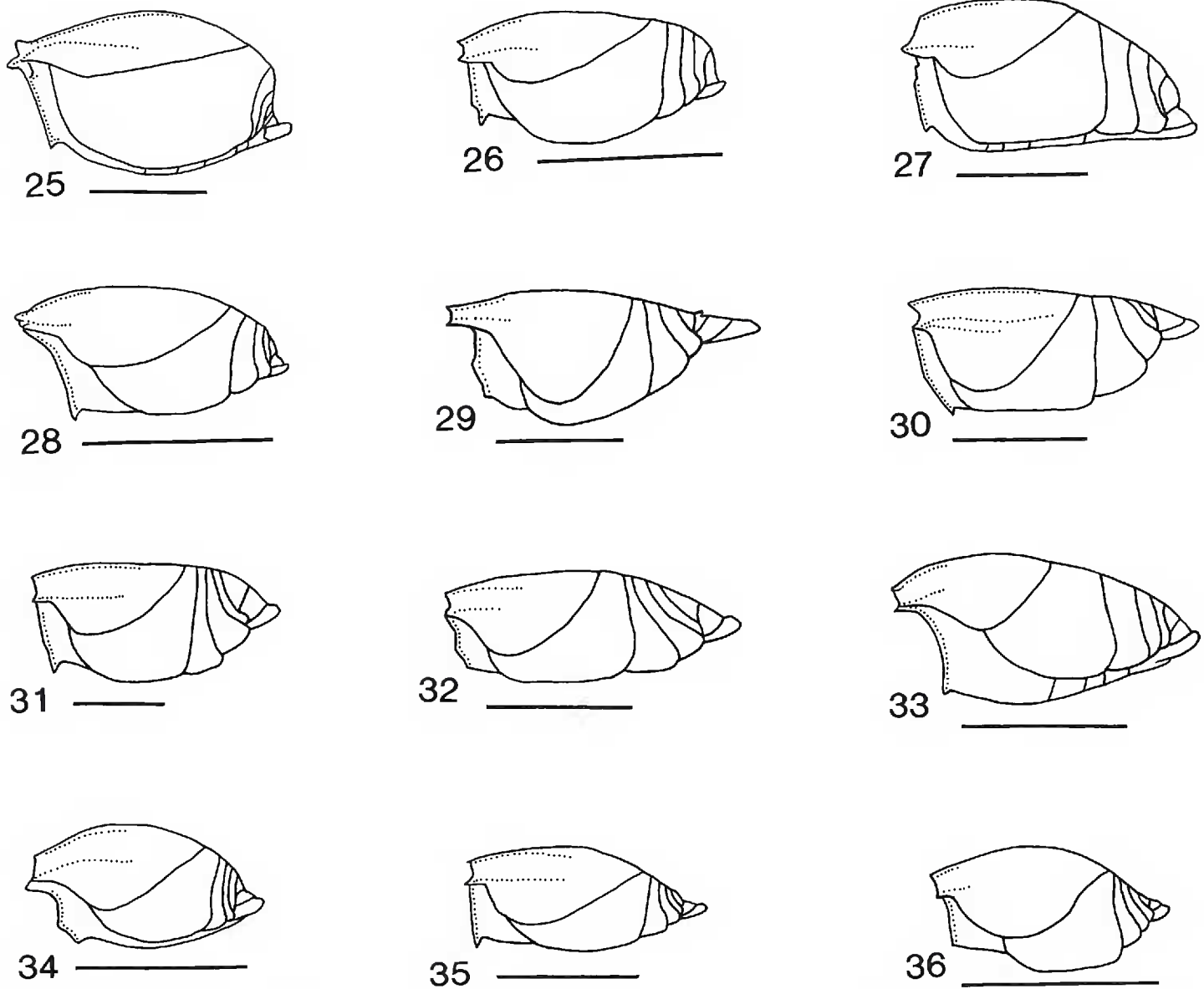
Female. (New description.) Length 3.2 mm. Like male except: mesosoma dorsally metallic green with apical one-half of mesoscutum violet; shape of scutellum (Fig. 15); metapleuron covered by 22 oval punctures, integument in punctures polished; *T1* $0.6 \times$ length of gaster; sculpture of *T1* dorsally, coriaceous between lateral carina, polished ventrad of lateral carinae, and punctate along posterior margin.

Diagnosis. — *Female*. This species can be distinguished from other species of *Notaspidium* by the presence of an arch-like preorbital carina and the unique morphology of its scutellum (Figs. 3, 15), abdomen, especially the carinae of *T1* (Figs. 27, 39), and hind femur (Fig. 51). *Male*. The male can be distinguished by its arch-like preorbital carina, scutellar shape (Figs. 62–65) and carinae morphology of *T1* (Fig. 39).

Variation. — Unknown. The two female specimens examined are alike. The male is known only from the holotype.

Distribution. — Belize and the West Indies.

Material Examined. — Type, and two females with data: BELIZE. 0–25 m, Jul 1975, N.L.H. Krauss (BMNH, USNM).

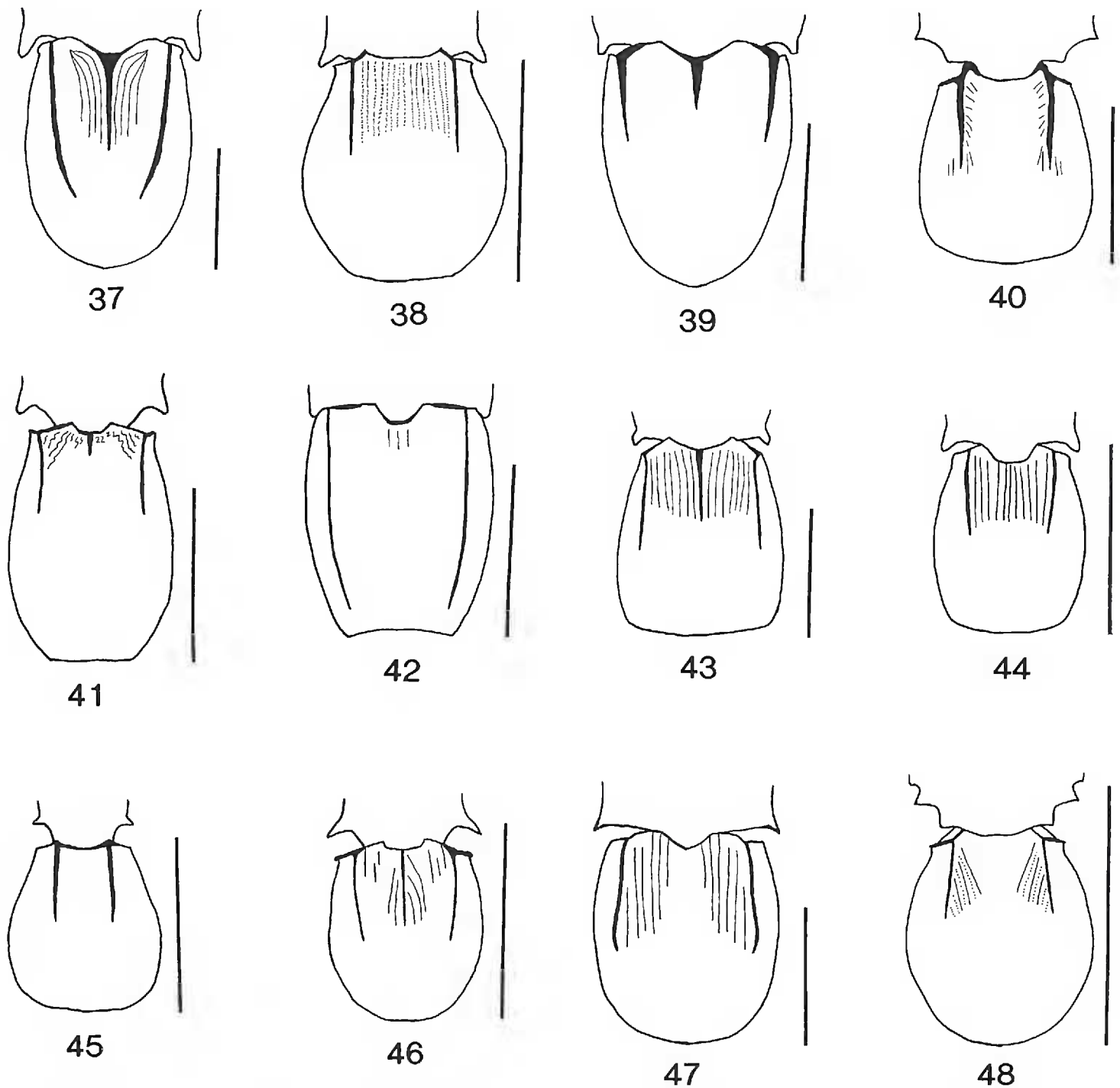


Figures 25–36. *Notaspidium* spp., females. Gaster in lateral view. Figure 25. *N. giganteum* NEW SPECIES. Figure 26. *N. villegasi* NEW SPECIES. Figure 27. *N. formiciforme* (Walker). Figure 28. *N. burdicki* NEW SPECIES. Figure 29. *N. acutum* NEW SPECIES. Figure 30. *N. truncatum* NEW SPECIES. Figure 31. *N. brazilense* NEW SPECIES. Figure 32. *N. hansonii* NEW SPECIES. Figure 33. *N. lineatum* NEW SPECIES. Figure 34. *N. boharti* NEW SPECIES. Figure 35. *N. mexicanum* NEW SPECIES. Figure 36. *N. minutum* NEW SPECIES. Scale lines 0.5 mm.

NOTASPIDIUM GIGANTEUM HALSTEAD, NEW SPECIES

(Figs. 1, 13, 25, 37, 49, 62–65)

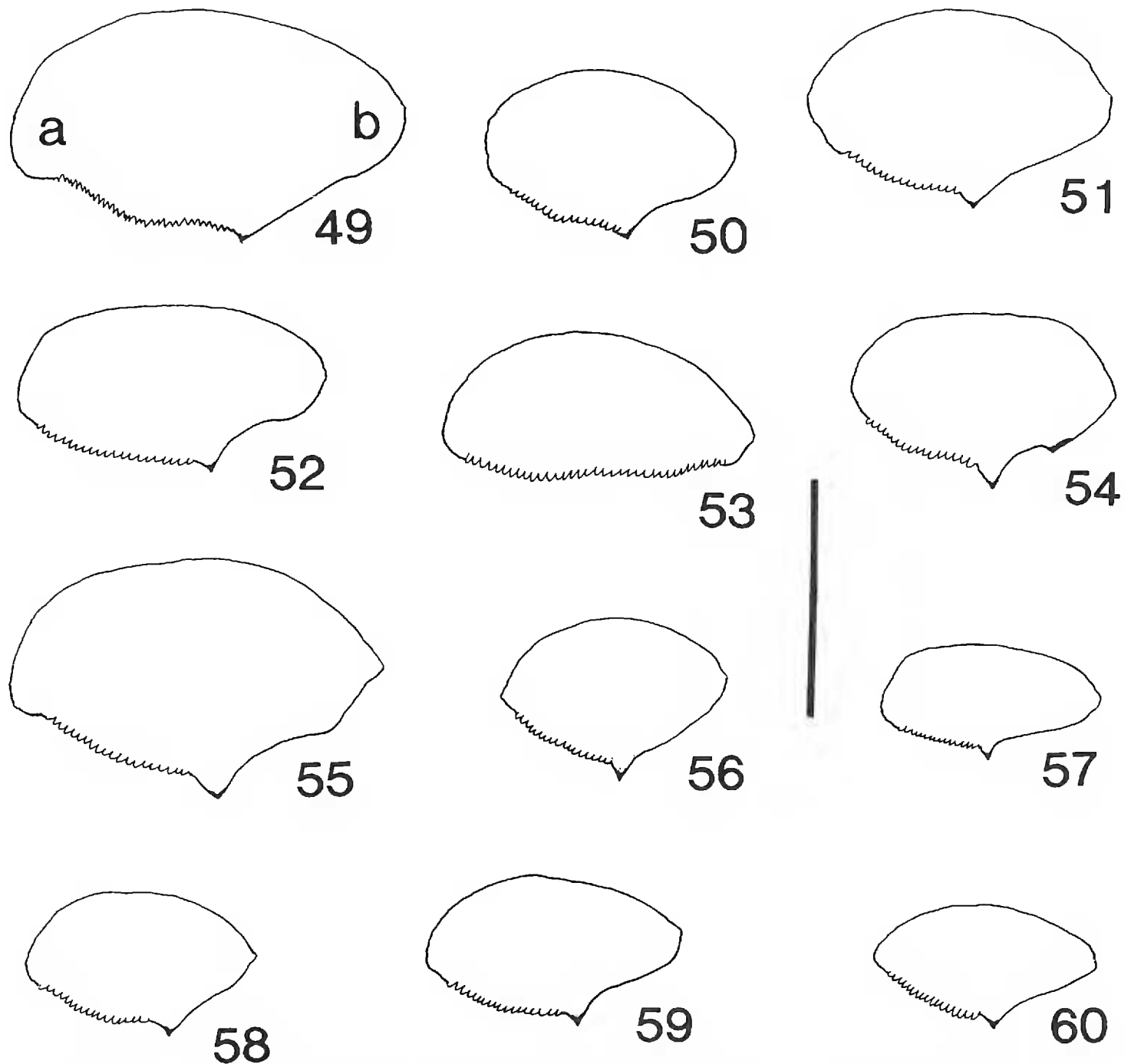
Types.—Holotype, female; allotype, male; data: MEXICO. *JALISCO*: Puerto Vallarta, 25 Jan 1984, G. E. Bohart. Holotype deposited in the Canadian National Collection, Ottawa (from USU). *Paratypes*: ARGENTINA. *JUJUY*: San Salvador de Jujuy, 21 Oct 1968, L. & C.W. O'Brien, 1 male, 1 female (AMNH). BRAZIL. "SP, Faz." Campininas, Mogi Gaucu, 1–8 Jan 1970, J. M. & B. A. Campbell, 1 male (USNM). COLOMBIA. 17 km S of Cali, 1000 m, 10 Apr 1971, Eberhard & Garcia, 1 male (USNM). COSTA RICA. C.A.T.I.E. (Centro Agronomico Tropical de Investigacion Y Ensenanza), 2 km SE of Turrialba, 7 July 1987, D. J. Burdick, 1 female (CNC, from CSUF). *GUANACASTE*: Guan. La Taborga For. Res., 9 km SW of Canas, 17–27 Feb 1987, W.L. Rubink, Malaise trap, 1 male, 1 female (USNM, from USU). ECUADOR. *NAPO*: Tena, 15 Feb 1986, A. Finnamore, 1 male (CNC). GUATEMALA. *ALTA VERAPAZ*: Cacao Trece Aguas, Apr 21, Schwartz & Barber, 1 female (USNM). HONDURAS. San Pedro Sula, Aug 1975, N.L.H. Krauss, 1 female (USNM). MEXICO. 1 male with same data



Figures 37–48. *Notaspidium* spp., females. Tergum 1 and apicolateral margin of propodeum in dorsal view. Figure 37. *N. giganteum* NEW SPECIES. Figure 38. *N. villegasi* NEW SPECIES. Figure 39. *N. formiciforme* (Walker). Figure 40. *N. burdicki* NEW SPECIES. Figure 41. *N. acutum* NEW SPECIES. Figure 42. *N. truncatum* NEW SPECIES. Figure 43. *N. brazilense* NEW SPECIES. Figure 44. *N. hansonii* NEW SPECIES. Figure 45. *N. lineatum* NEW SPECIES. Figure 46. *N. boharti* NEW SPECIES. Figure 47. *N. mexicanum* NEW SPECIES. Figure 48. *N. minutum* NEW SPECIES. Scale lines 0.5 mm.

and depository as holotype. *QUINTANA ROO*: 32 km N of Felipe Carrillo P., 17 Jul 1983, M. Kaulbars, 1 female (CNC). *YUCATAN*: 2 km E of Chichen Itza, 20 Jul 1983, 20 m, M. Kaulbars, 1 male (CNC). *PERU*. Rio Perene, Mar 29, C. H. T. Townsend, 1 male (USNM).

Description.—*Female* (holotype). *Length*: 3.7 mm. *Color*: dark metallic green with scape, pedicel, fore and mid trochanter and tibia, apex and base of mid femur, and tarsi testaceous; flagellum brown; scutellum centrally violet. *Scrobe cavity*: deeply concave, coriaceous. *Preorbital carina*: prominent, forming an arch just below anterior ocellus. *Scutellum*: rounded posteriorly in dorsal view (Fig. 1), dorsal margin convex and posterior margin truncate in lateral view (Fig. 13); punctures separated by their own diameter; sculpture coriaceous. *Metapleuron*: covered by about 25 oval punctures, sculpture in punctures coriaceous; septa between punctures $0.25 \times$ puncture diameter, integument polished. *Hind*



Figures 49–60. *Notaspidium* spp., females. Hind femur in lateral view. Base (b) of femur to right, apex (a) to left. Figure 49. *N. giganteum* NEW SPECIES. Figure 50. *N. villegasi* NEW SPECIES. Figure 51. *N. formiciforme* (Walker). Figure 52. *N. burdicki* NEW SPECIES. Figure 53. *N. acutum* NEW SPECIES. Figure 54. *N. truncatum* NEW SPECIES. Figure 55. *N. brazilense* NEW SPECIES. Figure 56. *N. hansonii* NEW SPECIES. Figure 57. *N. lineatum* NEW SPECIES. Figure 58. *N. boharti* NEW SPECIES. Figure 59. *N. mexicanum* NEW SPECIES. Figure 60. *N. minutum* NEW SPECIES. Scale lines 0.5 mm.

femur: as in Fig. 49. *Propodeum*: apicolateral margin (dorsal view) with a rounded tooth (Fig. 37); medially with a tear-drop shaped carina. *Gaster*: apex blunt, dorsal margin strongly convex (lateral view) (Fig. 25). T1 $0.8\times$ length of gaster (dorsal view), dorsally with a strong lateral carina which curves medially near the apex of T1, with a shorter strong median carina and 8 weak longitudinal carinae (Fig. 37), sculpture coriaceous except for polished band along lateral carina. *Terga*: punctate to coriaceous. T3–5: not projecting posterior of T2. *S1*: basally with a small tooth (Fig. 25).

Male. Like the female except: scutellum in dorsal view acuminate posteriorly (as in Fig. 5), dorsal margin convex and posterior margin triangular in lateral view (Fig. 62), punctures separated by $0.33\times$ (or less near apex) their diameter. T1 dorsally without longitudinal carinae.

Diagnosis.—*Female*. This species can be distinguished from other species of *Notaspidium* by the presence of an arch-like preorbital carina and the unique morphology of its scutellum (Figs. 1, 13), abdomen, especially the carinae of T1

(Figs. 25, 37), and hind femur (Fig. 49). *Male*. The male can be distinguished by its arch-like preorbital carina, scutellar shape (Fig. 61) and lack of carinae on T1.

Variation.—*Female*. Several with scutellum less convex than illustrated by Fig. 13. Medial carina of T1 rarely weak, usually as prominent as lateral carina. Mesosoma dorsally sometimes with violet, gold-green, or silver iridescence. Tegula rarely blue. *Male*. Apex of the scutellum varies from the typical form (Fig. 62) to as illustrated by Figs. 63–65. Sculpture of propodeum between major carinae rugose to smooth. Sculpture in punctures on metapleuron rugose to smooth. Sculpture of mesopleural acetabulum coriaceous or coriaceous with weak transverse carinae.

A male and female from Saint Vincent Island are not designated as paratypes because their mesosomas are a different color and more robust, and the sculpture of their body fainter and less dense than the type material. Color of the mesosoma in dorsal view is: apical one-half of scapula, apical one-third of scutellum, and apical one-half of mesoscutum purple; axillae, tegulae, and base of scutellum blue; remainder gold-green. These specimens vary from the type materials as follows: scutellum more convex and punctures smaller and separated by 0.5 to 1.0× their diameter; mesosoma overall, with fewer punctures; typically coriaceous areas are faintly coriaceous or polished; preorbital carina below anterior ocellus not prominent; and male with apex of scutellum slimmer and more acute (Fig. 63). The shape of the gaster, sculpture of T1 and propodeum, and rest of body are like the type material.

Distribution.—Argentina, Brazil, Columbia, Costa Rica, Ecuador, Guatemala, Honduras, Mexico, Peru, and West Indies.

Etymology.—Latin adjective describing the large body size.

Material Examined.—Types, and 1 male and 1 female from: WEST INDIES. Saint Vincent Island, H.H. Smith, #207 (USNM) (see Variation section).

NOTASPIDIUM VILLEGASI HALSTEAD, NEW SPECIES

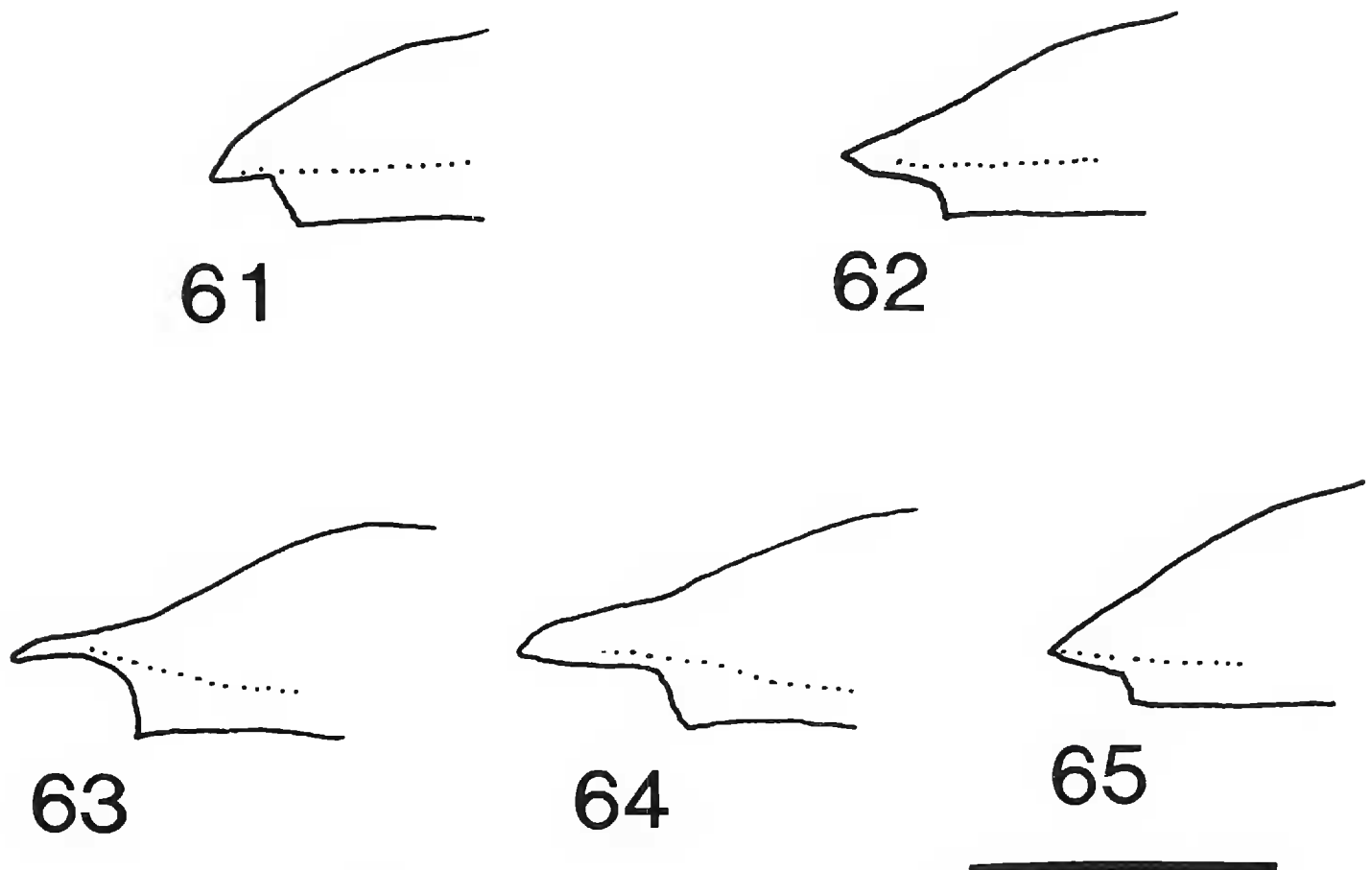
(Figs. 2, 14, 26, 38, 50)

Type.—Holotype, female; data: BRAZIL. *MATO GROSSO*: Sinop, Oct 1974, Malaise trap, M. Alvarenga. Holotype deposited in the Canadian National Collection.

Description.—*Female* (holotype). *Length*: 2.5 mm. *Color*: metallic green with flagellum brown; scape, pedicel, fore and mid legs (except coxa), and hind tarsus testaceous. *Scrobe cavity*: concave, coriaceous. *Preorbital carina*: weak, not arch-like below anterior ocellus. *Scutellum*: rounded posteriorly in dorsal view (Fig. 2), dorsal margin convex and posterior margin truncate in lateral view (Fig. 14); punctures separated by 0.25× their diameter; sculpture coriaceous. *Metapleuron*: covered by about 30 oval punctures, sculpture in punctures coriaceous; septa between punctures 0.16× puncture diameter, integument polished. *Hind femur*: as in Fig. 50. Apicolateral margin of propodeum (dorsal view) with a rounded tooth (Fig. 38). *Gaster*: apex blunt, dorsal margin convex (lateral view) (Fig. 26). *T1*: 0.6× length of gaster (dorsal view), dorsally with a strong lateral carina and 16 weak longitudinal carinae (Fig. 38), sculpture in carinate area coriaceous, basolateral area punctate, remainder polished. *T2*: basal one-half polished, apical one-half punctate. *T3–6*: coriaceous, and projecting slightly posterior of T2. *S1*: basally with a small tooth (Fig. 26).

Male. Unknown.

Diagnosis.—*Female*. This species can be distinguished from other species of *Notaspidium* by the absence of an arch-like preorbital carina and the unique



Figures 61–65. *Notaspidium* spp., males. Scutellum in lateral view. Figure 61. *N. formiciforme* (Walker) (Holotype). Figures 62–65. *N. giganteum* NEW SPECIES. Figure 62. typical form. Figures 63–65. variation (Saint Vincent Island, West Indies; Mexico, and Ecuador, respectively). Scale line 0.5 mm.

morphology of its scutellum (Figs. 2, 14), abdomen, especially the carinae of T1 (Figs. 26, 38), and hind femur (Fig. 50).

Variation.—Unknown. Species known only from the type specimen.

Distribution.—Brazil.

Etymology.—A noun in the genitive case from a modern personal name. Named in honor of Baldomero Villegas, my mentor at the California Department of Food and Agriculture, Biological Control Services Program.

Material Examined.—This species is known only from the type specimen.

NOTASPIDIUM BURDICKI HALSTEAD, NEW SPECIES
(Figs. 5, 16, 28, 40, 52)

Types.—Holotype, female; data: BRAZIL. MATO GROSSO: Sinop, Oct 1976, Malaise trap, M. Alvarenga. Holotype deposited in the Canadian National Collection. *Paratypes:* BRAZIL. 1 female with same data and depository as holotype; Linhares, E. Santo, Sep 1972, M. Alvarenga, 1 female (CNC); Represa Rio Grande Guanabara Dec 1967, M. Alvarenga, 1 female (CNC).

Description.—*Female* (holotype). *Length:* 3.0 mm. *Color:* dark metallic green with scape, pedicel, tegula, fore and mid legs, hind trochanter, apex of hind tibia, and hind tarsi orange; flagellum light brown. *Scrobe cavity:* deeply concave, coriaceous. *Preorbital carina:* prominent basally, ending dorsally at $0.75 \times$ eye height. *Scutellum:* acuminate posteriorly in dorsal view (Fig. 5); dorsal margin with a concave area in center and posterior margin acuminate in lateral view (Fig. 16); punctures separated by $0.25 \times$ their diameter; sculpture coriaceous. *Metapleuron:* covered with about 35 oval punctures, sculpture in punctures coriaceous; septa between punctures $0.25 \times$ puncture diameter, sculpture rugose. *Hind femur:* as in Fig. 52. *Propodeum:* apicolateral margin (dorsal view) with a small acute tooth (Fig.

40). *Gaster*: apex subacuminate, dorsal margin convex (lateral view) (Fig. 28). *T1*: $0.8 \times$ length of gaster (dorsal view), dorsally with a strong lateral carina (Fig. 40), integument polished except for rugose areas along carina. *Terga*: punctate to coriaceous. *T3-6*: projecting posterior of *T2*. *S1*: basally with a small tooth (Fig. 28).

Male. Unknown.

Diagnosis.—*Female*. This species can be distinguished from other species of *Notaspidium* by the absence of an arch-like preorbital carina and the unique morphology of its scutellum (Figs. 5, 16), abdomen, especially the carinae of *T1* (Figs. 28, 40), and hind femur (Fig. 52).

Variation.—Two paratypes with scutellum less pointed than Fig. 16 and apicolateral tooth of propodeum more acute than Fig. 40.

Distribution.—Brazil.

Etymology.—A noun in the genitive case from a modern personal name. Named in honor of Donald J. Burdick, my mentor at California State University, Fresno.

Material Examined.—This species is known only from the type specimens.

NOTASPIDIUM ACUTUM HALSTEAD, NEW SPECIES
(Figs. 4, 17, 29, 41, 53)

Types.—Holotype, female; data: BRAZIL. Linhares, E. Santo, Sep 1972, M. Alvarenga. Holotype deposited in the Canadian National Collection. *Paratypes*: BRAZIL. AMAZONAS: estirar de Equador, Rio Javari, Sep 1979, M. Alvarenga, 1 female (CNC). MATO GROSSO: Sinop, Feb 1976, O. Roppa, Malaise trap, 1 female (CNC). ECUADOR. NAPO: 12 km SW of Tena, 500 m, 8-11 Jul 1976, S. & J. Peck, 1 female (USNM).

Description.—*Female* (holotype). *Length*: 3.0 mm. *Color*: metallic green with gaster and hind coxa brown; antenna, tegula, fore and mid legs, hind trochanter, hind tarsi, and ovipositor sheath testaceous. *Scrobe cavity*: deeply concave, transversely striated. *Preorbital carina*: prominent, ending just below dorsal margin of eye. *Scutellum*: acuminate posteriorly in dorsal view (Fig. 4), dorsal margin with a concave area in center and posterior margin acuminate in lateral view (Fig. 17); punctures separated by $0.25 \times$ their diameter; sculpture basomedially coriaceous, remainder polished. *Metapleuron*: covered with about 28 oval punctures, integument in punctures polished; septa between punctures $0.16 \times$ puncture diameter, integument polished. *Hind femur*: as in Fig. 53. *Propodeum*: apicolateral margin (dorsal view) with a rounded tooth (Fig. 41). *Gaster*: apex acute, dorsal margin slightly convex (lateral view) (Fig. 29). *T1*: $0.6 \times$ length of gaster (dorsal view), dorsally with a strong lateral and median carina, vague short sinuate carinae basally (Fig. 41), remainder of integument polished. *T2*: polished, with two transverse lines of sublateral punctures. *T3-5*: polished, with a transverse line of sublateral punctures. *T6*: coriaceous. *T3-6*: projecting posterior of *T2*. *S1*: basally without a small tooth (Fig. 29).

Male. Unknown.

Diagnosis.—*Female*. This species can be distinguished from other species of *Notaspidium* by the absence of an arch-like preorbital carina and the unique morphology of its scutellum (Figs. 4, 17), abdomen, especially the carinae of *T1* (Figs. 29, 41), and hind femur (Fig. 53).

Variation.—One paratype with dorsal margin of scutellum (lateral view) nearly straight.

Distribution.—Brazil and Ecuador.

Etymology.—Latin adjective describing the finger-like, posterior projecting scutellum.

Material Examined.—This species is known only from the type specimens.

NOTASPIDIUM TRUNCATUM HALSTEAD, NEW SPECIES

(Figs. 6, 18, 30, 42, 54)

Types.—Holotype, female; data: HONDURAS. San Pedro Sula, Aug 1975, N.L.H. Krauss. Holotype deposited in U.S. National Museum of Natural History. *Paratypes:* BRAZIL. SANTA CATHARINA: Nova Teutonia, 12 Aug 1941, Fritz Plaumann, ex. dead branch, 1 female (CNC). TRINIDAD. Curepa, 1 Nov 1977, Malaise trap, 1 female (CNC); Maracas, 1–9 Dec 1977, Malaise trap, 1 female (CNC).

Description.—*Female* (holotype). *Length:* 2.8 mm. *Color:* dark metallic green with scutellum and scapula violet; gaster, hind trochanter, and hind femur brown; antenna, tegula, fore and mid legs, hind tarsi and ovipositor sheath (except for black apex) testaceous. *Scrobe cavity:* deeply concave, sculpture coriaceous. *Preorbital carina:* prominent basally, ending dorsally at $0.75 \times$ eye height. *Scutellum:* subacuminate posteriorly in dorsal view (Fig. 6), dorsal margin slightly convex and posterior margin triangular in lateral view (Fig. 18); punctures on basal one-half separated by $0.5 \times$ their diameter, those on apical one-half by $0.25 \times$ their diameter; sculpture coriaceous. *Metapleuron:* covered with about 30 oval punctures, sculpture in punctures coriaceous; septa between punctures 0.25 to $0.33 \times$ puncture diameter, integument polished. *Hind femur:* as is Fig. 54, with an inner tooth near base. *Propodeum:* apicolateral margin (dorsal view) without a projecting tooth (Fig. 42). *Gaster:* apex acute, dorsal margin nearly straight (lateral view) (Fig. 30). *T1:* $0.66 \times$ length of gaster (dorsal view), basal and apical margin truncate, dorsally with a long strong lateral carina (Fig. 42). T1 (dorsal view) longitudinally striated, polished along posterior margin and laterally. *T2–6:* coriaceous. *T3–6:* projecting posterior of T2. *S1:* basally with a small tooth (Fig. 30).

Male. Unknown.

Diagnosis.—*Female.* This species can be distinguished from other species of *Notaspidium* by the absence of an arch-like preorbital carina and the unique morphology of its scutellum (Figs. 6, 18), abdomen, especially the carinae of T1 (Figs. 30, 42), and hind femur (Fig. 54).

Variation.—Unknown. Specimens examined are alike.

Distribution.—Brazil, Honduras, and West Indies.

Etymology.—Latin adjective describing the truncate base and apex of T1 (dorsal view).

Material Examined.—This species is known only from the type specimens.

NOTASPIDIUM BRAZILIENSE HALSTEAD, NEW SPECIES

(Figs. 7, 19, 31, 43, 55)

Types.—Holotype, female; data: BRAZIL. Nova Teutonia, 27, 11' S, 52, 23' W, 300–500 m, 17 Mar 1967, Fritz Plaumann. Holotype deposited in the Canadian National Collection. *Paratype:* 1 female with same data and depository as holotype but collected 1973.

Description.—*Female* (holotype). *Length:* 3.5 mm. *Color:* metallic green with apical one-half of T1, scutellum centrally, scapula posteriorly, and axilla anteriorly, violet; flagellum, fore tibia, and mid tibia brown; scape, pedicel, remainder of fore and mid legs, and hind tarsi testaceous. *Scrobe cavity:* concave, coriaceous. *Preorbital carina:* absent. *Scutellum:* subacuminate posteriorly in dorsal view (Fig. 7), dorsal margin convex and posterior margin with a small rounded projection in lateral view (Fig. 19); punctures on apical one-half $2.0 \times$ size on basal one-half, punctures basally separated by $2.0 \times$ their diameter, centrally $1.0 \times$ and apically by $0.25 \times$ their diameter; sculpture coriaceous. *Metapleuron:* covered with about 35 oval punctures, sculpture in punctures coriaceous; septa between punctures 0.2 to $0.25 \times$ puncture diameter, sculpture faintly coriaceous. *Hind femur:* as in Fig. 55. *Propodeum:* apicolateral margin (dorsal view) with a rounded tooth (Fig. 43). *Gaster:* apex subacuminate, dorsal margin slightly convex (lateral view) (Fig. 31). *T1:* $0.5 \times$ length of gaster (dorsal view), dorsally with a strong lateral and median carina, about 14 weak longitudinal carinae between lateral

carinae (Fig. 43), sculpture coriaceous except for polished area ventrad of lateral carinae and small punctate area sublaterally near posterior margin. *T2-6*: coriaceous. *T3-6*: projecting posterior of *T2*. *S1*: basally with a small tooth (Fig. 31).

Male. Unknown.

Diagnosis.—Female. This species can be distinguished from other species of *Notaspidium* by the absence of an arch-like preorbital carina and the unique morphology of its scutellum (Figs. 7, 19), abdomen, especially the carinae of *T1* (Figs. 31, 43), and hind femur (Fig. 55).

Variation.—Unknown. Specimens examined are alike.

Distribution.—Brazil.

Etymology.—Latinized noun describing the collection locality (Brazil) of the holotype.

Material Examined.—This species is known only from the type specimens.

NOTASPIDIUM HANSONI HALSTEAD, NEW SPECIES
(Figs. 8, 20, 32, 44, 56)

Types.—Holotype, female; data: MEXICO. *NAYARIT*: San Blas area, 16-21 Mar 1983, J. W. Hanson. Holotype deposited in the Canadian National Collection (from USU). *Paratype*: JAMAICA. Port Antonio (at quarantine from Philadelphia, Pennsylvania), 21 Mar 1922, ex. lepidopterous pupa, C.A. Davis, Phil. No. 471, 1 female (USNM).

Description.—Female (holotype). *Length*: 2.7 mm. *Color*: metallic green with tegula metallic blue; antenna, legs (except tarsi), *T3-6* laterally, and ovipositor sheath brown; tarsi testaceous. *Scrobe cavity*: concave, coriaceous. *Preorbital carina*: absent. *Scutellum*: rounded posteriorly in dorsal view (Fig. 8), dorsal margin nearly straight and posterior margin with a small truncate projection in lateral view (Fig. 20); punctures separated by 1.0–2.0× their diameter in central region, by 0.25–1.0× in remainder; sculpture faintly coriaceous. *Metapleuron*: covered with about 25 oval punctures, integument in punctures polished; septa between punctures 0.2 to 0.33× puncture diameter, integument polished. *Hind femur*: as in Fig. 56. *Propodeum*: apicolateral margin (dorsal view) with a rounded tooth (Fig. 44). *Gaster*: apex acute, dorsal margin slightly convex (lateral view) (Fig. 32). *T1*: 0.66× length of gaster (dorsal view), dorsally with a strong lateral carina, and a weak median and 11 longitudinal carinae (Fig. 44), sculpture coriaceous centrally, polished band along posterior and lateral margins, and punctate sublaterally. *T2-6*: faintly coriaceous. *T3-6*: projecting posterior of *T2*. *S1*: basally without a small tooth (Fig. 32).

Male. Unknown.

Diagnosis.—Female. This species can be distinguished from other species of *Notaspidium* by the absence of an arch-like preorbital carina and the unique morphology of its scutellum (Figs. 8, 20), abdomen, especially the carinae of *T1* (Figs. 32, 44), and hind femur (Fig. 56).

Variation.—Paratype with dorsal margin of gaster (lateral view) nearly straight.

Distribution.—Mexico and Jamaica.

Etymology.—A noun in the genitive case from a modern personal name. Named in honor of Wilford Hanson, the collector.

Material Examined.—This species is known only from the type specimens.

NOTASPIDIUM LINEATUM HALSTEAD, NEW SPECIES
(Figs. 9, 21, 33, 45, 57)

Types.—Holotype, female; data: COSTA RICA. *HEREDIA*: Pto. Viejo, 50 m, rain forest, Feb 1980, W. Mason. Holotype deposited in the Canadian National Collection.

Description.—*Female* (holotype). *Length:* 3.0 mm. *Color:* dark metallic green with gaster and flagellum dark brown; scape, pedicel, tegula, fore and mid legs, hind trochanter, and hind tarsi testaceous; apex of fore and mid tibia cream-white. *Scrobe cavity:* deeply concave, coriaceous. *Preorbital carina:* absent. *Scutellum:* subacuminate posteriorly in dorsal view (Fig. 9), dorsal margin nearly straight and posterior margin obtuse in lateral view (Fig. 21); punctures separated by $0.25 \times$ their diameter; sculpture coriaceous. *Metapleuron:* covered with about 30 oval punctures, integument in punctures polished; septa between punctures $0.25 \times$ puncture diameter, sculpture rugose. *Hind femur:* as in Fig. 57. *Propodeum:* apicolateral margin (dorsal view) with a small acute tooth (Fig. 45). *Gaster:* apex subacuminate, dorsal margin convex (lateral view) (Fig. 33). *T1:* $0.5 \times$ length of gaster (dorsal view), dorsally with a strong lateral carina (Fig. 45), integument polished. *T2:* polished except for laterally on posterior one-half, remainder coriaceous. *T3–5:* with basal one-half polished, apical one-half coriaceous. *T6:* coriaceous. *T3–6:* projecting posterior of T2. *S1:* basally with a small tooth (Fig. 33).

Male. Unknown.

Diagnosis.—*Female.* This species can be distinguished from other species of *Notaspidium* by the absence of an arch-like preorbital carina and the unique morphology of its scutellum (Figs. 9, 21), abdomen, especially the carinae of T1 (Figs. 33, 45), and hind femur (Fig. 57).

Variation.—Unknown. Species known only from type specimen.

Distribution.—Costa Rica.

Etymology.—Latin adjective describing the linear or straight dorsal margin of the scutellum.

Material Examined.—This species is known only from the type specimen.

NOTASPIDIUM BOHARTI HALSTEAD, NEW SPECIES
(Figs. 10, 22, 34, 46, 58)

Types.—Holotype, female; data: MEXICO. CHIAPAS: Palenque, 10 Sep 1974, G. Bohart & W. Hanson. Holotype deposited in the Canadian National Collection (from USU).

Description.—*Female* (holotype). *Length:* 2.1 mm. *Color:* dark metallic green with flagellum brown; scape, pedicel, fore and mid legs, hind trochanter, and hind tarsi testaceous. *Scrobe cavity:* concave, coriaceous. *Preorbital carina:* absent. *Scutellum:* rounded posteriorly in dorsal view (Fig. 10), dorsal margin strongly convex and posterior margin rounded in lateral view (Fig. 22); punctures separated by 0.25 to $0.33 \times$ their diameter; sculpture coriaceous. *Metapleuron:* covered with about 32 oval punctures, integument in punctures polished; septa between punctures $0.2 \times$ puncture diameter, integument polished. *Hind femur:* as in Fig. 58. *Propodeum:* apicolateral margin (dorsal view) with a long acute tooth (Fig. 46). *Gaster:* apex subacuminate, dorsal margin convex (lateral view) (Fig. 34). *T1:* $0.75 \times$ length of gaster (dorsal view), dorsally with a strong lateral and median carina and five longitudinal carinae between lateral carinae (Fig. 46), integument polished. *T2:* laterally with posterior one-half coriaceous. *Terga:* remainder polished. *T3–6:* projecting posterior of T2. *S1:* basally without a small tooth (Fig. 34).

Male. Unknown.

Diagnosis.—*Female.* This species can be distinguished from other species of *Notaspidium* by the absence of an arch-like preorbital carina and the unique morphology of its scutellum (Figs. 10, 22), abdomen, especially the carinae of T1 (Figs. 34, 46), and hind femur (Fig. 58).

Variation.—Unknown. Species known only from type specimen.

Distribution.—Mexico.

Etymology.—A noun in the genitive case from a modern personal name. Named in honor of George Bohart, the collector.

Material Examined.—This species is known only from the type specimen.

NOTASPIDIUM MEXICANUM HALSTEAD, NEW SPECIES

(Figs. 11, 23, 35, 47, 59)

Types.—Holotype, female; data: MEXICO. *JALISCO*: "13 mi" N of Barra de Navidad, 13 Apr 1977, Davis & Hanson. Holotype deposited in the Canadian National Collection (from USU).

Description.—*Female* (holotype). *Length*: 2.3 mm. *Color*: metallic green with flagellum and fore tibia brown; scape, pedicel, first two flagellomeres, remainder of fore leg, mid leg (except coxa), hind trochanter, hind tarsi, and ovipositor sheath (except black apex) testaceous. *Scrobe cavity*: concave, coriaceous. *Preorbital carina*: absent. *Scutellum*: rounded posteriorly in dorsal view (Fig. 11), dorsal margin slightly convex and posterior margin truncate in lateral view (Fig. 23); punctures separated by $0.25 \times$ their diameter; sculpture coriaceous. *Metapleuron*: covered with about 26 oval punctures, integument in punctures polished; septa between punctures $0.25 \times$ puncture diameter, sculpture of ventral one-half coriaceous, remainder polished. *Hind femur*: as in Fig. 59. *Propodeum*: apicolateral margin (dorsal view) with a small acute tooth (Fig. 47). *Gaster*: apex acute, dorsal margin convex (lateral view) (Fig. 35). *T1*: $0.66 \times$ length of gaster (dorsal view), dorsally with a strong lateral carina, and 12 weak longitudinal carinae (Fig. 47), sculpture in carinate area coriaceous, polished band along posterior and lateral margins, remainder punctate. *T2*: punctate. *T3–6*: faintly coriaceous, and projecting posterior of T2. *S1*: basally with a small tooth (Fig. 35).

Male. Unknown.

Diagnosis.—*Female*. This species can be distinguished from other species of *Notaspidium* by the absence of an arch-like preorbital carina and the unique morphology of its scutellum (Figs. 11, 23), abdomen, especially the carinae of T1 (Figs. 35, 47), and hind femur (Fig. 59).

Variation.—Unknown. Species known only from type specimen.

Distribution.—Mexico.

Etymology.—Latinized noun describing the collection locality (Mexico) of the holotype.

Material Examined.—This species is known only from the type specimen.

NOTASPIDIUM MINUTUM HALSTEAD, NEW SPECIES

(Figs. 12, 24, 36, 48, 60)

Types.—Holotype, female; data: MEXICO. *CHIAPAS*: Palenque, 10 Sep 1974, G. Bohart & W. Hanson. Holotype deposited in the U.S. National Museum of Natural History (from USU). *Paratype*: MEXICO. *JALISCO*: Puerto Vallarta, 25 Jan 1984, G.E. Bohart, 1 female (CNC, from USU).

Description.—*Female* (holotype). *Length*: 2.1 mm. *Color*: metallic green with flagellum, fore tibia, and mid tibia brown; scape, pedicel, remainder of fore and mid legs, and hind tarsi testaceous. *Scrobe cavity*: shallowly concave, coriaceous; preorbital carina absent. *Scutellum*: rounded posteriorly in dorsal view (Fig. 12), dorsal margin slightly convex and posterior margin obtuse in lateral view (Fig. 24); punctures separated by $0.16 \times$ their diameter; sculpture coriaceous. *Metapleuron*: covered with about 20 oval punctures, sculpture in punctures forming asterisk-shaped ridges; septa between punctures $0.12 \times$ puncture diameter, integument polished. *Hind femur*: as in Fig. 60. *Propodeum*: apicolateral margin (dorsal view) with a small triangular tooth (Fig. 48). *Gaster*: apex subacuminate, dorsal margin convex (lateral view) (Fig. 36). *T1*: $0.84 \times$ length of gaster (dorsal view), dorsally with a strong lateral carina and a few weak medially angled carinae between lateral carina (Fig. 48), sculpture in carinate area rugose, laterally with a faintly punctate area, remainder polished. *T2*: punctate except for polished area along ventral and posterior margin. *T3–6*: polished (except for apical coriaceous band on T3), and projecting posterior of T2. *S1*: basally without a small tooth (Fig. 36).

Male. Unknown.

Diagnosis.—*Female*. This species can be distinguished from other species of

Notaspidium by the absence of an arch-like preorbital carina and the unique morphology of its scutellum (Figs. 12, 24), abdomen, especially the carinae of T1 (Figs. 36, 48), and hind femur (Fig. 60).

Variation.—Unknown. Specimens examined are alike.

Distribution.—Mexico.

Etymology.—Latin adjective describing the small body size.

Material Examined.—This species is known only from the type specimens.

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